



September 11, 2009

Mr. Steve Faryan
On-Scene Coordinator
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604

**Subject: Response to Comments on the Conceptual Plan for Landfill Gas Collection
Mallard North Landfill, Hanover Park, Illinois**

Dear Mr. Faryan:

On behalf of the Forest Preserve District of DuPage County (FPD), RMT, Inc. (RMT), has prepared this letter in response to the U.S. EPA/Weston Solutions comments on the Conceptual Plan for Landfill Gas Collection. The comments were contained in an e-mail dated September 3, 2009. Several of the comments will be addressed in more detail as part of the Landfill Gas Collection Design Report, which is currently in progress.

Sincerely,

RMT, Inc.


Jason R. Schoephoester
Environmental Scientist


Alan J. Schmidt
Project Manager

Attachment: Response to Comments on the Conceptual Plan for Landfill Gas Collection

cc: Walter Nied – U.S. EPA
Omprakash Patel – Weston Solutions, Inc.
Tom Rivera – IEPA
Joe Benedict – Forest Preserve District of DuPage County

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Response to Comments on the Conceptual Plan for Landfill Gas Collection

U.S. EPA Comment – Sampling the West Branch of the DuPage River (WBDR)

1. *Sampling the creek US and DS of the Landfill to determine if the leachate collection system has lowered the NH₄ conc.*

FDP Response: The sampling of the WBDR, which was performed on May 21, 2009, indicated concentrations of un-ionized ammonia which were below the 35 IAC Part 302, Subpart D criteria for secondary contact and indigenous aquatic species. However, the FPD will collect a sample from the WBDR at each of the four locations sampled in May 2009 (upstream, prior to confluence with Keeneyville Creek, after the confluence with Keeneyville Creek, and at the downstream boundary of MNL. The samples will be analyzed the sample for total ammonia. Field measurements of pH and temperature will be performed and the un-ionized ammonia concentrations will be calculated based on these data.

U.S. EPA Comment – General Microturbine Comment

2. *Convince/with design and Estimates that they install an Micro-Turbine to produce electricity from the NEW Properly designed 12" Extraction Wells.*

FDP Response: Based on RMT's extensive experience with other small microturbine and landfill gas to energy (LFG2E) systems, the installation of a LFG2E system at the MNL is not recommended at this time. The goal of the landfill gas collection system (LFGCS) should be the containment of landfill gas (LFG) to the site and the control of off-site LFG migration, not energy production at this time.

We agree that beneficial reuse of LFG is an excellent energy production alternative and the FPD is willing to consider beneficial reuse at a later date, if and when data have been collected to support such an alternative. Implementation of a LFG2E system requires extensive engineering, design, energy analyses, negotiations with the utility providers, permitting, etc.

It does not make good engineering design, or financial sense to install a LFG2E system concurrent with the installation of a LFGCS. Until a determination can be made as to the volume and methane quality of the LFG that can be effectively recovered, it is not good engineering, science or design to correctly size a LFG2E system, nor determine if such a system would be economically viable. In nearly every case when a LFG2E system is installed, a LFGCS has already been in operation and monitored for a period of time. The information collected during this monitoring period is critical to sizing a LFG2E system and making an accurate prediction of the volume of landfill gas available, the energy production capabilities, and the long-term viability of a LFG2E system. Once the LFGCS is put into operation and historical gas collection system monitoring data is available, the viability of a beneficial use for the LFG can be

evaluated. The FPD is not ruling out the possibility of a LFG2E system, but it should be done in a sensible and logical manner.

There are also significant administrative and schedule implications related to a LFG2E system compared to the LFGCS proposed by RMT. The FPD Board of Commissioners has already approved the use of FPD funds to implement a LFGCS; therefore, the system can be installed relatively soon. In order for the Board to approve the implementation of a LFG2E system, a performance evaluation/proforma will need to be prepared and presented for Board review/approval. As indicated above, the data to support such an evaluation will be collected once the LFGCS is implemented. In addition, based on the FPD's existing LFG2E systems, the FPD is being paid a blended rate of 2.8 cents per KWH, which is low by industry standards with respect to return on investment. Pursuing a LFG2E system at this point in time would delay implementation of a LFGCS.

U.S. EPA Comment – General New Gas Extraction Wells Comment

3. *I concur with Westons comments and as you and I discussed we should request that they install 3 new large diameter gas collection wells with leachate collection pumps and Landtech well heads. One large diameter well should be installed on DuPage Forest property near LDE-13 to have a greater effect on the gas migration near the Green Brook School. LDE-13 was installed with a rotary drill and has no flow possibly due to the drilling method. All of the other gas collection wells at Mallard North are 20-30 yrs old and we should start with the best technology we have available to us.*

FPD Response: The FPD agrees that new extraction wells may potentially need to be installed; however, the FPD believes that the initial LFGCS should utilize the existing gas vents since these vents may be sufficient to control the potential for offsite migration of LFG. The integrity and effectiveness of the existing gas vents will be further evaluated following startup of the LFGCS and following a period of operation. If it is determined that the existing gas vents are insufficient for controlling the potential for off-site migration or of poor integrity, then new extraction wells will be installed. An initial evaluation of the existing gas vents that are proposed for inclusion in the LFGCS indicates the vents are not damaged, there is no exposed well screen at ground surface, and LFG is present at the vents. The existing gas vents will be fitted with wellheads to allow for balancing and monitoring of the LFGCS. Information related to the wellheads and monitoring will be provided in the Landfill Gas Collection System Design Report, which will be submitted soon. Furthermore, there are technologies available to restore the integrity and surface seal of existing LFG vents and extraction wells, if necessary.

The goal of this LFGCS is to apply a vacuum to the waste mass and remove LFG from within the waste mass to prevent off-site migration of LFG. The FPD does not plan on

installing LFG extraction wells near LDE-13 as part of this project. Investigation and remedial activities associated with the Green Brook School area are being performed under an agreement between BFI, U.S. EPA and the FPD and should be addressed in that forum.

U.S. EPA Comment – Background

4. *Provide information on how it was determined that the casing for probe G-116 was cracked at the water table surface. The concentration of methane in G-116 is 70 to 80 percent methane which is significantly higher concentration than found in typical landfill gas suggesting that CO2 is being scrubbed. Therefore, a thorough evaluation of this location needs to be done.*

FPD Response: RMT acknowledges that a methane concentration over 70% typically suggests that the LFG is being “cleaned” by passage through a liquid. Although not the typical situation, it is not unusual to see methane concentrations at 70% or greater in a landfill. As requested by U.S. EPA in Comment 9 of the April 17, 2009 Review Comments on the Landfill Gas Investigation Workplan, RMT evaluated G-116 to assess the source of the methane at G-116, since the liquid in the well was often bubbling, implying the gas was likely entering the well near the water surface. G-116 is screened at approximately 31-36 feet bgs in clay, and it is highly unlikely that the bubbling is caused by methane migration within liquid in the clay soil at this depth. The evaluation involved recording the initial water level in the well, which was at 11.41 feet below the top of casing (ft. BTOC). At this time, there was obvious bubbling in the casing and a LFG odor. Two bailer volumes of water were removed from the well, depressing the water level to 12.25 ft BTOC. The bubbling stopped at this point and a slight hissing noise could be heard in the well casing, indicating the gas was entering just above the depressed water level (approximately 19 feet above the top of the screen). This suggests that the casing is likely cracked or a riser pipe connection is leaking at approximately 12.25 ft. BTOC.

U.S. EPA Comment – Objective

5. *Some of the monitoring probes are suggesting that the gas in the probes is from methane dissolved in groundwater. Significant amount of waste at the site could be submerged. Explain how the current plan addresses migration of dissolved gas in groundwater.*

FPD Response: The proposed LFGCS is designed to target the source of the methane in specific areas of concern in the landfill. Removal of methane from these targeted areas should significantly reduce the potential for off-site migration of LFG in the unsaturated zone and also reduce the volume of methane that dissolves into the liquid phase. One method of addressing methane migration in the dissolved phase in groundwater is to apply a vacuum to the source of the methane. By targeting the areas

of concern with a vacuum, the result should be a preferential path for LFG, routing it through each LFGCS instead of migrating offsite. Furthermore, applying a slight negative pressure should reduce the rate at which methane is dissolving in the groundwater. By creating a slight vacuum and decreasing the concentration of methane in the unsaturated zone, the methane that is already dissolved in the groundwater will tend to preferentially diffuse into the unsaturated/lower methane concentration zone in an attempt to reach equilibrium. For example, if a jar is half filled with water and there is 20% methane in both the water and the air, the jar is in equilibrium. If the concentration of methane in the air is reduced to 5%, the gas dissolved in the water will attempt to reach equilibrium with the air, thus reducing the concentration in the dissolved phase in the water. This initial LFGCS will be continually evaluated following startup to determine the effectiveness of the system and if needed, further action will be taken.

U.S. EPA Comment - Overall System Design

6. *Provide how each system performance will be evaluated.*

FPD Response: The performance monitoring and evaluation of each LFGCS will be discussed in the Landfill Gas Collection System Design Report, which is in progress.

7. *Provide parameters and monitoring locations that will be utilized to determine if additional gas extraction locations are required.*

FPD Response: This issue will be discussed as part of the monitoring plan in the Landfill Gas Collection System Design Report, which is in progress.

8. *Additional active landfill gas collection locations should be added especially near DV-10; and between DV-10 and DV-6. Also it is recommended to connect DV-6 to a blower. This recommendation is made because migration of landfill gas is evident in the eastern-southeastern portion of the site; gas bubbles have been observed in the pond; and rigorous bubbling of potential landfill gas has been observed in a water filled animal burrow on the east side of the pond. The rigorous bubbling is suggesting that landfill gas in that area could be under significant pressure. The passive vent suggested at the DV-6 will not significantly aid in reducing gas pressure.*

FPD Response: As discussed during the August 27th meeting, the areas of LFG migration concern in the southeast portion of the site are near perimeter gas probes GP-30, GP-31, and G-113. These areas will be addressed by connecting nearby extraction points, including SV-12, EWL-2, and UAV-2, to the LFGCS. Furthermore, deeper gas vents are being included, such as DV-3, DV-12, and DV-13 to influence the area toward the interior of the landfill. DV-10 was not included in the initial LFGCS, because the screen is submerged and because nearby gas vent DV-3 is included in the LFGCS. Significant changes are being made to the landfill in the vicinity of DV-6 and the pond. As part of the cover repair, the pond is being removed and the cover

reconfigured so that there is positive surface water drainage in this area. These changes may have an effect on LFG distribution and the potential for migration. DV-6 will continue to be monitored and actions will be taken if consistent methane is detected in the perimeter gas probes in that portion of the landfill. Over the past several months, only two methane detections have occurred along the eastern edge of the site, with both occurring at GP-17. Since June 17, 2009 there have been no methane detections at GP-17 or at other points along the far eastern edge of the site. These probes will continue to be monitored on a monthly basis, as part of the routine monitoring.

9. *The leachate extraction trench should be evaluated for collecting landfill gas.*

FPD Response: Plans are in progress to seal the trench at manholes MH-1 and MH-2 so that it is possible to monitor for the presence of LFG in the extraction trench. At this time, it is not advisable to connect the leachate extraction trench to the LFGCS, due to the potential for air intrusion into the shallow trench. The connection of the leachate extraction trench to the LFGCS would likely have a detrimental effect on the operation of the system.

10. *What criteria were used to determine usability of the probes suggested as landfill gas extraction locations?*

FPD Response: The gas vents for each of the two LFGCS were selected based on their location, integrity, presence of methane, and the availability of open screen. The vents selected have at least 2.5 feet of open screen. A mixture of vents located near the perimeter probes with methane detections and interior, deeper probes were selected. Vents selected appear to have good integrity near the ground surface and no screen is visible.

11. *Additional extraction wells and expansion of the treatment system may be necessary if the suggested system is not able to contain the landfill gas within the waste limits. Also if the suggested locations are found to be compromised or are not able to perform as landfill gas extraction wells they must be replaced.*

FPD Response: As discussed during the August 27th meeting, the FPD and RMT agree that additional extraction wells may be necessary if the proposed LFGCS is not able to contain the LFGs within the landfill boundary, as determined by perimeter gas probe monitoring. Furthermore, if the gas vents included in the LGCS are found to be ineffective, their replacement will be evaluated based on the importance of the well to the LFGCS.

12. *Provide plans and specifications; Construction Quality Assurance and Quality Control Plan; Revised Health and Safety Plan; Operation and Monitoring Plan for the landfill; and waste management plan (if needed).*

FPD Response: This information will be provided as part of the Final Landfill Gas Collection System Design Report, which is in progress.

13. *Since one of the sources for methane is suspected to be dissolved methane in groundwater, it is recommended that the site wide groundwater be monitored.*

FPD Response: The FPD and RMT agree that methane is likely moving in the dissolved phase in the groundwater as evidenced by the presence of methane in gas probes where the well screens are submerged in groundwater. For example, data from gas probes GP-30 and GP-31 suggest that carbon dioxide is being stripped as the LFG migrates in groundwater and that methane is being concentrated in the probes as it off gasses. Groundwater monitoring for methane may serve little purpose, since it will likely confirm what we know from the gas data. However the FPD is willing to consider limited groundwater monitoring for methane to confirm that methane is present in the groundwater.